

DEPRIVATION PATTERN IN THE USA*

G. Ghellini (Univ. of Siena)

N. Pannuzi (Ph.D. Student, Univ. of Florence)

L. Stanghellini (C.R.I.DI.RE, Univ. of Siena)

SUMMARY.

The paper proposes a relative and multidimensional measure of deprivation in a dynamic context. The aim is to overcome the limits of traditional measures of deprivation based on poverty lines, exclusively estimated on the basis of monetary variables such as income or consumption expenditure, by utilising all of the available information on actual living conditions; such variables as housing conditions, financial supports, health and job conditions will then be taken into account. Moreover, the analysis also considers the dynamic aspect of the phenomenon, in order to distinguish between transitory and permanent deprivation, and to identify those people who are chronically deprived, and who, if one assumes they are incapable of improving their conditions, should represent the first target of socio-economic policies.

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INTRODUCTION

For less developed countries, the traditional measures of poverty, often based on absolute and unidimensional approaches and referring strictly to monetary variables, seem to represent a good way to describe the phenomenon; this is the case, for example, for countries where poverty can be realistically defined as a condition lower than the subsistence level, objectively observable. On the other hand, such a definition does not seem to work well for countries in transition or for developed countries. For the first, in fact, even if it is possible to observe situations of serious material deprivation, it does not seem acceptable to use measures based on simple subsistence. Moreover, measures based only on monetary variables (income or consumption expenditure) can be considered inadequate, because the relationship between these kinds of variables and the actual living conditions is not sufficiently strong to allow their indiscriminate use. The same consideration on income is still valid for developed countries, where this variable is undoubtedly an indicator of poverty, but it cannot represent the single indicator used to measure a phenomenon such as poverty. This is, in well-developed countries, a worse condition for some people in the population than for others, showing a plurality of shape and degree that transforms it into what may be more realistic concept of relative deprivation.

Another variable which assumes a relevant importance in poverty studies is the temporal dimension; in fact, it should also be taken into account to define anti-poverty policies. If longitudinal information on several variables that can serve as indicators of poverty is available, it is possible to obtain a quantitative and qualitative measure of living conditions, and to distinguish between transitory and permanent deprivation. It is therefore possible to identify those who remain in poverty over the entire observation period, and who, if one assumes their inability to improve their condition, should represent the first target of socio-economic policies.

The present work refers to an analysis of poverty in the USA during the eighties, using the well-known fuzzy sets methodology to offer a multidimensional (considering a plurality of variables as indicators of poverty situations) and dynamic analysis of deprivation.

In this paper, the dynamic analysis refers to the estimation of transition matrices between the deprivation states obtained from the fuzzy sets application, during the years under consideration (1984-1988).

The paper is organised as follows: Section 1 presents the principal aspects of a multidimensional approach to poverty, in particular the choice of indicators and the fuzzy sets methodology. Longitudinal aspects of poverty analysis and summary of the problems related to panel surveys, specifically the Panel Study on Income Dynamic (PSID), are considered in Section 2. Section 3 contains a description of the application and of the principal results obtained, at both the cross-sectional and longitudinal levels. The final Section contains the conclusions.

1. THE DEPRIVATION INDICATORS APPROACH

The first, traditional concept of poverty was an **absolute** one, defining it as the “state of existence at, or below, physical subsistence”, measured in terms of income and lack of basic requirements (Carbonaro, 1991).

All traditional approaches, based on poverty lines and equivalence scales, have two fundamental characteristics:

- i) they require a sharp division of the socio-economic units between *poor* and *not-poor*;
- ii) the only indicator of poverty is income or, alternatively, consumption expenditures.

It can be argued that concentration on these aspects led to an extreme simplification of such a complex and multifaceted phenomenon. Furthermore, both individual and familial income measures are affected by systematic measurement errors, because of the subjects’ reticence to state their real incomes. Finally, we can often observe wide fluctuations in income, which can cause serious problems in assessing poverty in households whose income varies strongly over short periods.

The problems related to income measures can be overcome by using a **relative-multivariate** approach, developed in the last two decades, that attempts to assess poverty using a set of social indicators (called deprivation indicators) representing several dimensions of the individual life-style (level of education, housing variables, health care, occupation and so on). Within the deprivation indicators method, income represents only one among many different indicators of a state of poverty (Townsend-1979, Whale-1991, Mack and Lansley-1985, Desai and Shah-1988).

Surely, the most widespread definition of such a multidimensional approach is that of Townsend (1979):

“Individuals, families can be said to be in poverty when they lack the resources to obtain the type of diet, participate in the activities and have the living conditions and amenities which are customary, or at least widely encouraged or approved, in the societies to which they belong. Their resources are so seriously below those commanded by the average individual that they are, in effect, excluded from ordinary living patterns, customs and activities”.

In this sense, poverty is defined by the lack of those resources, goods, activities and services that allow the individual to participate in the general standard of living of the community to which he belongs: it is a state of relative deprivation, strictly linked to the examined society. It is important to stress that non-monetary indicators are specifically related to material deprivation, based on lack of financial resources. So, persons who are unable to take part in the customary social activities because of poor education or ill health, can be said to be “marginalized, socially excluded”, but they will be termed as “poor” only if their difficulties are caused by material, financial lack.

Another particular characteristic is that multiple measurements are required of all the dimensions of the phenomenon, and on each sample unit. These will then be combined into an overall deprivation index. Townsend (1979) distinguished a total of sixty of those measurements or variables across the twelve following dimensions: i) dietary, ii) clothing, iii) fuel and light, iv) household facilities, v) housing conditions, vi) work conditions, vii) health, viii) education, ix) environment, x) family activities, xi) recreation, and xii) social relations.

These categories have been used in several further works developed by Mack and Lansley (1985), Desai and Shah (1988) and Muffels (1993).

As Whale (1993) pointed out, the multidimensional approach based on non-monetary indicators has a number of major advantages over income-measure methods:

- i) it goes deeper into the meaning and nature of poverty, since data collected allow the researcher to describe the household life-style;
- ii) it strongly facilitates comparison between different social groups, being based on a concrete set of commodities and activities. This is very important in the case of international analysis;

iii) it is less sensitive to wide fluctuations in income that can cause problems for the assessment of the state of poverty using income-based measures.

iv) it is easier, from an operational point of view, since it requires only data referring to the possibility of engaging in certain activities (taking a holiday, belonging to an association, etc.), possessing specific commodities (adequate food, consumer durables, etc.) or remaining free from debt or other situations of financial distress. This usually gives higher quality data than income measure-based methods because respondents are less reticent to give truthful answers.

1.1 - The choice of indicators

The choice of indicators to be used in an analysis of poverty is one of the most delicate points in the survey analysis phase: every set of variables is based on a specific definition of poverty and will lead to different economic policies towards those families identified as poor. The main problems to be taken into account in such a phase are: i) cultural dependence of indicators, ii) temporal dependence, iii) presence of subjective elements, and iv) balance between material and non-material items. It is possible to make the following more detailed remarks about these problems:

i) Given the very nature of non-monetary indicators, it is not possible to derive a set of items completely independent from the social, cultural, geographic, economic and historical context in which the individual lives. In fact, the usefulness of a variable as a deprivation indicator is closely linked both to material factors (geographic position, climatic conditions, etc.) and to the prevailing norms and customs of the community. This question refers to the differences existing among unlike countries as well as to those relating to various social subgroups and minorities co-existing within the same society. In both cases, all social items should be checked for cross-cultural validity.

ii) Over time, every society is subjected to both economic and technical developments, which can cause changes in the meaning of deprivation. For example, while we might, ten years ago., have referred to “television”, nowadays it makes no sense: we have to speak of “colour television”. In deriving the set of indicators to be used, the researcher should include those items remaining good social indicators, despite cultural and technological changes. This is not easy in panel surveys covering long periods.

iii) Subjective questions (asking the respondent to report his situation or feeling about his level of satisfaction) might be included in the relevant questionnaire. In Townsend's opinion (1993), people do not recognise the forces driving them and this might involve an element of false consciousness in defining their real necessities. Whale (1993) believes that the inclusion of such subjective elements extends the notion of poverty too far. They both suggest restriction of the analysis to the use of objective questions only. Other authors (Desai and Shah, 1988) believe that subjective questions should be included in the questionnaire to reflect the difference in people's tastes.

iv) Measures such as state of health could also be included within the set of social indicators. These factors certainly do influence the individual's overall well being but, again, it is questionable whether they should be included in the concept of poverty. Whale (1993) suggests the use of only material items or activities which cost money to be acquired.

1.2 - The fuzzy sets methodology

The fuzzy sets methodology allows the researcher to overcome the clear distinction between poor and not poor units that the use of each poverty line necessarily requires. Within this approach, poverty is not an attribute that a subject can present or not present; it is intended as a characteristic showing several shades included between two extreme situations of very high wealth and deep material indigence.

Zadeh (1978) defined a fuzzy subset A of Y a set of ordered pairs: $(y, f_A(y))$, where Y is the set of elements $y \in Y$ and f_A the mapping from Y into the closed interval $[0,1]$. f_A is called the "membership" function (m.f.) to the fuzzy subset A . It indicates the degree of belonging of the element y to A . The following situations can be observed:

If $f_A(y) = 0$ the element $y \in Y$ does not belong to A .

Opposite, if $f_A(y) = 1$ the element $y \in Y$ *totally* belongs to A .

Finally, if $0 < f_A(y) < 1$ the element $y \in Y$ just *partially* belongs to A .

It is possible to derive a different degree of belonging, using a set of K qualitative variables $(X_1, X_2, \dots, X_K)$ such that at least one modality of each represents a poverty's symptom. In the case of polithomous indicators, these will be turned into dichotomous ones, giving value equal to 1

to those categories indicating a situation of socio-economic difficulty, while the remaining ones will be equated to 0.

Using this approach, various dimensions of poverty are taken into account; consequently the presence of a single deprivation symptom cannot be considered as a poverty state.

In the realistic assumption that indicators have different weights, since there is also a difference in their contribution in determining an individual's standard of living, $f_A(y)$ is obtained as a weighed mean:

$$f_A(i) = \frac{\sum_j x_{ij} w_j}{\sum_j w_j} \quad (1.1)$$

where w_j is the weight related to x_j .

Several weighting systems can be used. In each of them, to satisfy the relative concept of poverty, w_j must be inversely proportional to the quota (f_j) of people in the population showing the symptom x_j . Cerioli and Zani (1989) adopted the following one:

$$w_j = \log \frac{1}{f_j} \quad (1.2)$$

that avoids the risk of assigning too much importance to the extremely rare poverty situations. If $f_j = 0$, w_j is not defined, no sampling unit presents the symptom j : x_j will be eliminated since it is not an appropriate indicator for the examined society. Instead, if $f_j = 1$, it means that each person in the population presents such a symptom. The corresponding weight will be 0.

From the estimation of the degree of belonging $f_A(y)$, for each statistical unit, it is possible to aggregate these individual data to get an overall poverty index referring to the whole population: it represents the degree of poverty present in the population. Such a measure is defined as the average of the n individual degrees of belonging:

$$P = \frac{1}{n} \sum_i f_A(i) \quad (1.3)$$

If a sample weighting system must be used the index becomes:

$$P = \frac{\sum_i f_A(i) \cdot u_i}{\sum_i u_i} \quad (1.4)$$

where u_i is the individual weight.

P takes values in the range $[0,1]$. In particular:

$P = 0$ if there is completely absence of poverty;

$P = 1$ if each unit on the population is totally poor.

2. LONGITUDINAL ASPECTS OF POVERTY ANALYSIS

2.1 Reasons for longitudinal surveys.

Cross sectional data can obviously be used to estimate characteristics and parameters relative to a population, at a specific point of time (t). In a poverty study, for instance, they can measure the proportion of people that are poor in t . Nevertheless another kind of survey has developed in recent years: the longitudinal survey. These allow the analysis of the development of a phenomenon across time in a more detailed way. Moreover, in the case of poverty analysis, they can show, for example, what proportion of those who are poor in one period remain poor in another.

As Duncan and Kalton (1987) pointed out, the various kinds of longitudinal data can meet the following information needs:

- I) Estimates of characteristics, activity, behaviour or attitude for one point in time
- ii) Estimates of net changes between two or more time periods
- iii) Estimates of gross changes between two or more time periods
- iv) Estimates of trends based on several time periods
- v) Estimates of duration, transitions or frequency of occurrence for specific kind of events for specific groups of persons
- vi) Estimates of characteristics based on cumulating data over time

- vii) Estimates of rare events based on cumulating data over time
- viii) Estimates of relationships among characteristics.

As can be easily observed, they potentially offer a much wider application field. Several longitudinal survey designs have been elaborated: *repeated surveys* (a series of subsequent cross-sectional surveys, conducted on separate, independent samples), *retrospective surveys* (containing data referring to past events that might have happened years, months or just few weeks before interview) and *panel surveys* (following a particular group of units across time). Each of these answers different information needs and involves different problems.

In this paper we will deal with only panel designs.

2.2 Typical errors in panel data

Panel surveys are usually preferred to cross-sectional ones, because of their wider application, but we cannot forget that they also create problems (panel conditioning, non-response attrition, recall error), involving various sources of error that are not encountered in cross-sectional designs. These have to be taken into consideration if we want high-quality results. In particular, we have to consider the following.

i) Attrition is related to failure to respond by those who were selected for inclusion in the sample and who answered in a previous wave. It can occur either because of the respondent's refusal or because the respondent could not be found for interview (due to household moves and migrations, deaths or simply because they were not at home at the time of the interview). We can make a distinction between permanently lost units, such as in cases of death, and merely temporarily lost units; these, in any case, create deep holes in individual longitudinal files and also create potentially biased data. Regarding refusal rates, it seems to be proportional to the respondent's burden: it has, in fact, been observed that refusal rates rise when the waves are carried out close to each other and when the sample-

unit is asked financial or particularly personal questions. To deal with non-response attrition, proper weighting systems can be used. In any case, the maximisation of response rates must be attempted, using for example: periodic checks to detect household address changes, monetary incentives to respondents, persuasion letters for persons reluctant to continue as respondents, periodic mailing of bulletins and reports of how data have been used, and advance announcement of the forthcoming interview.

ii) Recall error is the error that arises when people cannot remember whether or when events have taken place. It causes events omissions, incorrect placing of events in time, and reports of events that never happened. Usually, the further in the past and the more numerous the events the respondent is asked to remember, the more frequent the recall errors occur. Among recall errors, the following can be distinguished: internal telescoping, external telescoping and the seam effect.

Internal telescoping consists in shifts in the timing of events within the recall period, while *external telescoping* occurs when events are placed in the wrong reference period. The *seam effect* is, on the other hand, the respondents' tendency to place events at the 'seam' between two subsequent reference periods. Panel surveys, unlike retrospective surveys, can reduce recall errors using shorter reference periods. To prevent external telescoping, 'bounding' techniques can be applied.

iii) Panel conditioning is the phenomenon that results when the expected value of a person's response to an interview's question is different depending on how many times he/she has answered in the previous waves. It means that participation in a panel survey might affect the answers. The main question is: does the long presence in a panel affect only the answer or, more deeply, does it affect the respondents' actual behaviour? It is most likely dependant on the kind of interview: in some circumstances (Solon, 1989), a behavioural change can be assumed, since the questions can actually increase individual interest and consciousness towards political matters; otherwise, it can hardly be believed that a long period of participation in a survey might affect

demographic or economic behaviours. Sometime it does happen that respondents, remembering the previous interviews, choose a question so as to avoid additional ones.

2.3 The Panel Study of Income Dynamics (PSID)

The PSID is a longitudinal survey conducted since 1968 by the Survey Research Centre of the Michigan University, on a representative sample of US persons (men, women, children) and on the families to which they belong. The main aspects to be considered are the following:

- a) PSID has been derived from two previous independent cross-sectional samples:
 - i) the SRC (Survey Research Centre) survey, which used a national stratified multi-stage sample and
 - i) the SEO (Survey of Economic Opportunity), which used a sample of low-income families living in southern US regions; this second sample was included because the original focus of the research project was the study of the dynamics of poverty;
- b) it uses a probability sample but with unequal selection probabilities: compensatory weights are supplied on PSID data files to compensate for both unequal selection probabilities and non-response attrition;
- c) starting with a sample of about 4800 households, it has traced the life of individuals originally belonging to those families, whether or not they have gone on living in the same dwelling and with the same persons. It follows sample members' children even when they depart from the original family to form their own. At the present time, it includes more than 20, 000 sample families;
- d) the main contents of the study are economic and demographic, with detailed information on income sources and amounts, employment, family composition changes and residential location; it also includes a wide range of sociological and psychological measures. The general design and core contents have remained largely unchanged;

every year the PSID staff expends considerable effort to maximise the response rate and to collect, control, code and clean the data, so as to assure their high quality;

e) data are collected in annual waves with telephone interviews (since 1974), but personal interviews are still used for sampling units having health problems or no telephone;

f) data referring to the core contents (income, household mobility, employment) are collected annually, while data on additional topics (health, retirement plans, retrospective childbirth, adoption, marital histories) are intermittently gathered;

g) the reference period is the year;

h) the analysis can be developed at both individual and family level;

2.4 - PSID for longitudinal studies

As we have seen, the PSID contains detailed information on several items. In addition, the PSID staff tries, year by year, to maintain the main contents of the study almost unchanged and, at the same time, to assure a high quality of data through a series of control operations. These characteristics make the PSID data sets appropriate for use in cross-sectional, longitudinal and inter-generational research of various kinds. However, before analysing the data, some characteristics have to be taken into account.

Use of weights is necessary because, in the PSID sample, the following biases can be observed: a higher proportion of low-income families, derived from the SEO sample; a larger proportion of young family units and individuals than appears in the whole population (this happens because PSID follows sample members' children as they grow up and form their own families; some differential attrition over years; and immigration, since 1968, not well represented inside the sample).

For these reasons, a weighting system is needed if we want to obtain unbiased estimates that can be applied to the whole US population. In PSID data, both individual and family weights are available (see Hill, 1992).

Moreover, if the unit of the analysis is the family, the problem is its definition in a longitudinal context. In fact, developing longitudinal studies, the researcher must remember that families are subject to composition changes over time; this makes definition of a 'longitudinal family', intended to be the *same* family across time, extremely difficult. In the PSID sample, about one quarter of all the sampled households experiences at least one composition change from one year to the next. Generally, the individual is a better suited unit for longitudinal analysis using PSID data than the family, but in many cases, such as in poverty studies, it is fundamental to consider the individual within the family context. In such a situation, the sample might be restricted to families with no composition changes in the chosen waves, but in this way, the resulting sample size might be too small in studies involving several years.

The solution adopted for the PSID longitudinal families is: restricting the analysis to the households with no changes in 'heads' or 'spouses', using family-level variables and individual-level variables referring only to the head and the spouse and, finally, introducing family weights to represent families.

3. A MULTIDIMENSIONAL POVERTY ANALYSIS BASED ON PSID DATA

3.1- Cross sectional poverty analysis

The multi-dimensional approach to poverty, presented in the previous paragraphs, will be applied to the PSID dataset, to obtain both a static and a dynamic analysis of the phenomenon in US society through 1984-1988. First, a set of variables that appear to be good social indicators in the context of the chosen society must be derived; this is an important step for all the subsequent work and for all the results, both from the cross-sectional and the longitudinal point of view.

We have, in the main, followed the twelve dimensions suggested by Townsend (1979), taking both cultural and temporal specificity into account. Specifically referring to the PSID sample, the application is strongly conditioned by the availability of the information on the various subjects surveyed. For instance, since the main focus of the study for which the PSID data are designed is the dynamics of income, data on durable goods and services inside the housing unit are not collected at each wave and it has been possible to select only the 13 deprivation indicators listed below:

1. The decile of the “familial income to needs” distribution
2. Total financial help received from relatives
3. Ownership of the house
4. Ratio “actual rooms to minimum required rooms”
5. Type of dwelling unit
6. Ownership of a car
7. Ratio “income recipients to family size”
8. Use of food stamps
9. Holiday far from home
- 10/11. Employment status of both the head of the family and the spouse
- 12/13. Physical or nervous conditions limiting working activities of both the head of the family and the spouse.

All the previous items have been transformed into qualitative dichotomous variables, assigning the value 1 to those categories of answers that indicate the presence of a deprivation symptom. From the frequencies of these dichotomous variables, shown in Table 3.1, the corresponding weights have been calculated using [1.2].

TAB. 3.1 Frequencies relative to the indicators in the years 1984-1988

Indic./Years	1984	1985	1986	1987	1988
1	0.48122	0.48470	0.48926	0.49168	0.49202
2	0.06283	0.05299	0.00000	0.00000	0.00000
3	0.34493	0.35188	0.34557	0.34324	0.34476
4	0.00000	0.00000	0.00000	0.00000	0.00000
5	0.05242	0.05753	0.06326	0.07348	0.07393
6	0.09641	0.09290	0.09487	0.00000	0.00000
7	0.00000	0.05071	0.00000	0.00000	0.00000
8	0.51359	0.50214	0.51931	0.52552	0.53743
9	0.37414	0.38945	0.38751	0.38692	0.37125
10	0.10930	0.09635	0.09408	0.09159	0.08807
11	0.36955	0.35179	0.47383	0.42585	0.46525
12	0.00000	0.00000	0.00000	0.00000	0.00000
13	0.45297	0.49558	0.55407	0.49014	0.58461

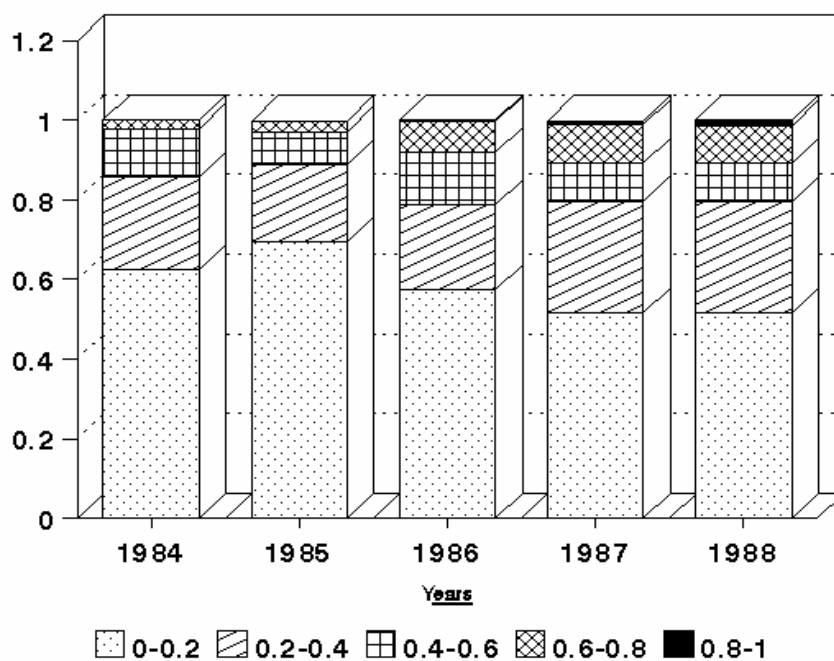
To obtain the transition estimates, the individual membership functions, calculated by (1.1), have been divided into five ordered classes, on the basis of rising values of deprivation.

Consequently, the 0-0.2 class corresponds to those households whose living conditions are satisfactory, at least with regard to the aspects included in the analysis. Conversely, the 0.8-1 class includes the families presenting the symptom of deprivation on almost all the considered dimensions. Figure 1 reports the estimated percentages of units that belong to each category.

Across time, we can clearly observe a wide increase of households in the last two classes; in fact, the proportion of families whose degree of belonging is greater than 0.6 passes from 2.1% in 1984 to 10.7% in 1988, while the households belonging to the 0-0.2 class diminish by about 11% (from about 62% to 51%). The percentage related to the intermediate classes (0.2-0.4 and 0.4-0.6) remains almost unchanged.

Because of both the over-representation of low-income and young age families and the under-representation of immigrants within the sample, it has been necessary to include family weights (available in the PSID cross-sectional files) in the index computation to get unbiased estimates.

FIG.1 Frequencies distribution of m.f. classes.



The estimated values of the P index, based on (1.4), are reported In Table 3.2.

TAB. 3.2 The P index in 1984-1988

Years	P index
1984	0.15603
1985	0.13485
1986	0.18000
1987	0.20522
1988	0.20512

As the analysis of the degree of belonging has already made clear, poverty has shown a rising trend since the second wave and onwards. In 1985, about 13 households out of 100 were included in the fuzzy subset of the poor; in 1988, there were more than 20.

3.2 Dynamic poverty analysis

To determine whether poverty is a short-term situation, (due to contingent negative factors, such as a depression of the economic-cycle) or a long-term one (that is, a permanent condition handed on from generation to generation within the same families), a longitudinal analysis is required. Such a distinction is very important, since "transitory" poverty is a phenomenon tending to solve itself, while "permanent" poverty is a deeper problem, requiring implementation of particular socio-political policies for its reduction. Such longitudinal research can only be developed by linking the cross-sectional individual information concerning the degree of belonging at the subsequent waves. To carry this out, PSID data need to be restricted: we will consider only those families successfully interviewed at all the selected waves.

The individual degree of belonging referring to two subsequent waves can be arranged in a transition matrix, showing the changes and the persistencies in the different levels of socio-economic deprivation of the surveyed families. The entries on the principal diagonal represent those households whose degree of belonging remains in the same class; because of the ordering of the categories (that is, the same as the cross-sectional analysis), the entries above the principal diagonal correspond to the movements towards worsened living conditions, while those below the diagonal show the socio-economic improvements.

TAB. 3.3 1984-1985 transition matrix (frequencies and row percentages)

1984	1985					
	0-0.2	0.2-0.4	0.4-0.6	0.6-0.8	0.8-1	total
0-0.2	11501	936	154	16	0	12607
	91.23	7.42	1.22	0.13	0.00	62.14
0.2-0.4	2205	2017	465	85	2	4774
	46.19	42.25	9.74	1.78	0.04	2353
0.4-0.6	283	921	923	341	3	2471
	11.45	37.27	37.35	13.80	0.12	12.18
0.6-0.8	31	90	174	136	0	431
	7.19	20.88	40.37	31.55	0.00	2.12
0.8-1	2	0	3	0	0	5
	40.00	0.00	60.00	0.00	0.00	0.02
total	14022	3964	1719	578	5	20288
	69.11	19.54	8.47	2.85	0.02	100.00

TAB. 3.4 1985-1986 transition matrix (frequencies and row percentages)

1985	1986						
	0-0.2	0.2-0.4	0.4-0.6	0.6-0.8	0.8-1	total	
	0-0.2	10726	2785	458	48	5	14022
		76.49	19.86	3.27	0.34	0.04	69.11
	0.2-0.4	823	1301	1447	393	0	3964
		20.76	32.82	36.50	9.91	0.00	19.54
	0.4-0.6	62	254	617	755	31	1719
		3.61	14.78	35.89	43.92	1.80	8.47
	0.6-0.8	7	26	114	413	18	578
		1.21	4.50	19.72	71.45	3.11	2.85
0.8-1	0	0	2	3	0	5	
	0.00	0.00	40.00	60.00	0.00	0.02	
total	11618	4366	2638	1612	54	20288	
	57.27	21.52	13.00	7.95	0.27	100.00	

TAB. 3.5 1986-1987 transition matrix (frequencies and row percentages)

1986	1987						
	0-0.2	0.2-0.4	0.4-0.6	0.6-0.8	0.8-1	total	
	0-0.2	9137	2126	268	80	7	11618
		78.65	18.30	2.31	0.69	0.06	57.27
	0.2-0.4	1083	2419	658	181	25	4366
		24.81	55.41	15.07	4.15	0.57	21.52
	0.4-0.6	248	947	694	714	35	2638
		9.40	35.90	26.31	27.07	1.33	13.00
	0.6-0.8	28	195	330	934	125	1612
		1.74	12.10	20.47	57.94	7.75	7.95
0.8-1	0	4	5	16	29	54	
	0.00	7.41	9.26	29.63	53.70	0.27	
total	10496	5691	1955	1925	221	20288	
	51.74	28.05	9.64	9.49	1.09	100.00	

TAB. 3.6 1987-1988 transition matrix_(frequencies and row percentages)

1987	1988					
	0-0.2	0.2-0.4	0.4-0.6	0.6-0.8	0.8-1	total
0-0.2	8931	1282	212	66	5	10496
	85.09	12.21	2.02	0.63	0.02	51.74
0.2-0.4	1303	3562	509	285	32	5691
	22.90	62.59	8.94	5.01	0.56	28.05
0.4-0.6	216	499	927	278	35	1955
	11.05	25.52	47.42	14.22	1.79	9.64
0.6-0.8	39	310	300	1201	75	1925
	2.03	16.10	15.58	62.39	1.79	9.49
0.8-1	4	11	33	63	110	221
	1.81	4.98	14.93	28.51	49.77	1.09
total	10493	5664	1981	1893	257	20288
	51.72	27.92	9.76	9.33	1.27	100.00

In order to investigate the permanence of the poverty phenomenon, the percentage of those in a “permanent poverty” condition (i.e. people staying in the same m.f. class over the entire period) has been calculated; this has also been done to estimate the global level of mobility as the difference between the total population and the number of people remaining on the transition matrix main diagonal for all years considered. The percentage estimates are reported in Table 3.7, where those calculated for the whole population are shown in the first column, and those calculated on the first year incidence are shown in the second.

TAB. 3.7 Percentage of persistence on the same m.f. class from 1984 to 1988

m.f. classes	% population	% initial prop.
0-0.2	29.02	46.7
0.2-0.4	1.13	4.8
0.4-0.6	0.21	1.4
0.6-0.8	0.17	8.1
0.8-1	0	0

The values show that, for the US population, poverty is a short-run phenomenon; in fact, just 10.18% of the people showing a membership function value greater than 0.6 obtained the classes 0.6-0.8 and 0.8-1 in just one class) stay in the same situation for all the period, corresponding to 0.2% of the whole population. In relation to mobility, the total level is estimated at around 64%, with an annual percentage of 30%. This means that every year about 1/3 of the population changes its m.f. to the “poor set”.

Poverty dynamics can be illustrated by the transition matrices, and it is possible to observe that in the first period an improvement is estimated (18.5% of the population moves towards a lower degree of poverty while 9.8% goes in the opposite direction), and for the following years a worsening situation is shown.

TAB. 3.8 Cross-section incidence for each m.f. class.

M.F. classes	1984	1985	1986	1987	1988
0-0.2	62.14	69.11	57.27	51.74	51.72
0.2-0.4	23.53	19.54	21.52	28.05	27.92
0.4-0.6	12.18	8.47	13.00	9.64	9.76
0.6-0.8	2.12	2.85	7.95	9.49	9.33
0.8-1	0.02	0.02	0.27	1.09	1.27

The cross-sectional measures are synthesised in Table 3.8. The improvement from the first to the second year is also evident from this kind of measure, where the percentage of people in the first class increases. Referring in particular to the situation of relatively high deprivation (that is, the last two classes), it is possible to confirm that their incidence is increased throughout the period, indicating a general worsening and an incidence that, from the longitudinal analysis, does not always involve the same people.

FINAL REMARKS

The poverty analysis based on PSID data collected during the eighties is based on cross - sectional and longitudinal measures of the phenomenon persistence, distinguishing between chronic and transitory conditions.

This kind of analysis is particularly interesting in the US context, where, in the face of rather high cross- sectional measures of poverty (an average of 10% referring to people with a m.f. value higher than 0.6), it is possible to observe that the percentage of chronic deprivation, for the same classification, is lower than 1%. Thus, it is possible to affirm that, in the United States, poverty is a short-term phenomenon, where a value of total mobility higher than 64% and an annual average around 30% indicates that deprivation conditions are subject to frequent changes.

This kind of information could not be obtained from cross-sectional analysis; for example, the comparison of the cross-sectional measures (1984-1988) allows us to discover the same worsening situation during the period but is not able to detect the actual mobility flows shown by the longitudinal analysis. In fact, the cross-sectional analysis simply shows that poverty (of course not distinguished as transitory or permanent) determines an incidence almost constant during the first two periods, but palpably higher for the last three.

Transitory poverty, then, appears to be the most relevant phenomenon, drawing a picture of deprivation coherent with the US reality, where poverty situations are closely linked to income and job conditions (given the well-known minimum social assistance) that show a dynamic surely higher than the traditional European standard.

The multi-dimensional analysis has created the possibility of discovering these characteristics, based on several indicators of poverty, not only on income or consumption expenditure. This choice is made in order to eliminate the strong bias due to measurement errors present in this kind of variable and to estimate the real changes in living conditions, not their simple "potentiality" due to a sudden and sometimes isolated change in current income level. The transition estimate is then related to changes in poverty symptoms, essentially related to housing conditions, financial supports, health and job conditions of the principal members of the household (head of household and spouse or partner). This kind of approach, apart from the problem related to the availability of relevant information, can surely give a reliable measure of poverty, even for countries that are either in economic transition or already developed.

This paper presents a proposal for new methods that can be further developed, particularly in relation to the longitudinal aspect where the classification of the m.f. in five classes has a strong influence on the obtained results. In this sense, a flows analysis or a minimum entropy approach could represent a valid solution.

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